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A CLINICAL STUDY OF *AKSHOTAKA* (*JUGLANSREGIA* LINN.) TO EVALUATE ITS EFFICACY AS *MEDHYA*

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ABSTRACT

In an increasingly competitive and fast paced world, people have a tendency to ignore their mental well-being.Stress is the major cause. Coupled with external and internal pressures, an average person leads to turbulent life. *Juglansregia*Linn. is a medicinal plant that has been widely used in traditional.As per Ayurvedic-text,*Medha* is the synonyms of *'Pragya'*,by whichperson becomes learned. *Medha*, has a great role in the prevention of diseases and maintenance of good health.The word*Medha* covers *dhee, dhriti* and *smriti*. The internal structure of*Akshotaka* looks like brain which emphasis its use on brain. The present review, attempts to provide comprehensive information on the clinical efficacy of *Akshotaka* as *Medhya*.A total of 30 volunteers were selected for the present study of age group above 18 years. All the selected individuals were studied under a single group. Volunteers were assessed according to subjective and objective parameters. Various laboratory investigations were also performed on the volunteers to rule out any organic and systemic disease.

Keywords: *Juglansregia, Medha, Pragya, Akshotaka,Medhya*.

INTRODUCTION

The survival of any organism, human depends on having adequate information about the external environment, where food is to be found and where hazards abound. Equally important is the information about internal environment. All these information is stored, assessed and utilized by creation of God i.e. *medha*. ***"Sarvambahushrutamvishayikaroti"***[1] i.e. due to *medha*, a person will be able to obtain the knowledge of existing objects and hence person becomes learned. As per Ayurvedic text *medha* is the synonym of '*Pragya*'[2]. In other words, it can be said that *medha*is a power which grasps and retains the knowledge [3]. Therefore it can be inferred that *medha*, has a great role in the prevention of diseases and maintenance of good health. Many references are available in Ayurvedic classics regarding-*medhya* drugs which confirm the importance of *medha*. *Medha* is a power that grasps and retains the knowledge. In this regards, some scholar has told that it is one of the faculty of *buddhi*[4], while others as the synonyms of *buddhi*[5]. Also *medha* is understood by the meaning mental vigor or power, Intelli-

gence or prudence, wisdom, retention of knowledge for long period residue of which can be further expressed in proper time[6].Thus the function of *medha* and its origin will be similar to *buddhi* i.e. perception and determination of knowledge. As without *smriti, buddhi* cannot be utilized, *medha*can be correlated with *dhee,dhreeti, smriti* as a whole. In other words it should be understood that *medha* is memory and memory related functioning of mind.

In an increasingly competitive and fast paced world, people have a tendency to ignore their mental well-being. However it is a well-known fact that if the root to these ailments is narrowed down, one can very well deal and stay away with such problems.

Stress is the major cause, be it academic, work related or other personal problems, people have become increasingly prone to stress. Coupled with external, societal, parental and one's own internal pressures, an average Indian leads to turbulent life.

The drug *Akshotaka* has been selected as a trial drug, on the basis of reference in classical text regarding its use as *Medhyaviz.*

"Vatamsadrishyoakshodaparammedhyoanilapaha"[7]

The *Majja* of *Akshotaka*, looks like the structure of brain. In Ayurveda it is called as "Doctrine of Signature" means the action of drug resembles its structure. Hence *Akshotaka* is regarded as brain tonic.

AIMS AND OBJECTIVES

1. To record data on safety and efficacy of the drug.
2. To record data on any adverse effect of the drug.
3. To evaluate the clinical efficacy of *Akshotaka* as *Medhya*.

MATERIAL AND METHODS

ETHICAL CLEARANCE:

The present study was approved by members of institutional, R.G.G.P.G Ayurvedic Hospital, Paprola, Ethical Committee

STUDY DESIGN:

A total of 30 volunteers were selected for the present study from campus of R.G.G.P.G Ayurvedic Hospital, Paprola, of age group above 18 years, irrespective of caste, sex, race and religion. All the individuals were healthy beings without any specific complaints and participated in the trial voluntarily. These voluntary individuals were taken under the trial to see the memory booster effects. All the selected individuals were studied under a single group.

Clinical study was carried out under direct supervision of Guide and Co-guides, by taking an account of inclusion and exclusion criteria. Detailed history was taken according to the proforma prepared for the study incorporating all the relevant points.

Diagnostic Criteria

For diagnosis, detailed medical history was taken and physical examination was done in detail according to both modern and Ayurvedic clinical methods. Volunteers were investigated according to diagnostic criteria which includes different tests. A special scale "PGI Memory Scale" [8] is used and a proforma according to scale was prepared to evaluate different types of memory.

Selection of volunteers:

Inclusion criteria

- Healthy volunteers willing to participate in the trial and diagnosed to have impaired memory as per the Memory Scale.
- Volunteers of age group above 18 years, irrespective of sex, caste and religion.
- Uncomplicated cases of memory disorder.

Exclusion criteria

i. Volunteers unwilling to participate in the trial.
ii. Volunteers persisting with complaints like CVA, Mental retardation, psychoneurosis and any major pathology related to CNS.
iii. Volunteers having history of any complications with the use of *AkshotakaMajja*.

Consent of volunteers

All the volunteers selected for the trial were explained the nature of study and their consent was obtained on the proforma before inclusion in the study.

Laboratory Investigations:

Estimation of Hb%, TLC, DLC, ESR, FBS, Lipid profile, RFT, Uric acid, SGOT, SGPT were carried out on the volunteers to rule out any organic and systemic disease.

Duration of trial-60 days

Follow up-After every 15 days during trial (i. e. on 15^{th}, 30^{th} and 45^{th} day during trial and on 60^{th} day after the trial.)

Formulation [9]–*AkshotakaMajja.*

Route of administration [9] -Oral

Dose[9] - 5 g of *Majja* twice daily

Criteria for Assessment-

The efficacy of the drug given was assessed on the basis of the following criteria:

1. Improvement in general condition was assessed by improvement in subjective symptoms.
2. Improvement in total score was assessed by 'PGI Memory Scale'

In the present study majority of volunteers i.e. 36.67% were reported in the age group of 21-30 years followed by 30% in the age group of 31-40 years. Majority of volunteers were female (56.67 %) and 96.67% are Hindus, 46.67% of volunteers are educated up to graduate level and 36.67% volunteers were students and73.33% were from middle class. 66.67% of volunteers were belonging to urban area, 73.33% were having active life style and70% were having *KruraKoshtha*.70% of volunteers were of *Vata-kapha* Prakriti, 100% were having *Rajasika Prakriti*.53.33% were under psychic stress, 23.33% were having no stress and 23.33% of were under physical stress. Majority of the volunteers 70% were having *Madhayama Sattva*.

RESULTS-

Table 1: Effect on Hematological Profile

Sr. No	Variables	Mean		% relief		SD±	SE±	't'	P
		BT	AT	Diff.	%age				
1.	Hb (gm%)	10.036	10.056	0.020	0.199	0.096	0.017	1.140	>0.005
2.	TLC (cumm)	6467.46	6519.3	51.87	0.80	419.25	76.54	0.678	>0.005
3.	DLC (%)								
a.	Neutrophills	63.64	64.44	0.8	1.257	11.06	1.56	0.511	>0.05
b.	Eosinophils	2.08	1.80	0.28	13.46	2.03	0.28	0.975	>0.05
c.	Lymphocytes	33.78	32.48	1.3	3.848	6.74	0.95	1.36	>0.05
d.	Monocytes	1.08	1.16	0.08	7.41	0.52	0.72	1.07	>0.05
e.	Basophils	0.3	0.3	0	0	0	0		>0.05
4.	ESR (mm fall in I^{st}hr)	11.12	12.02	0.9	8.093	23.87	3.37	1.48	>0.05

Table 2: Effect on Biochemical Profile

Sr. No.	Variables	Mean		% relief		SD±	SE±	't'	P
		BT	AT	Diff.	%age				
1.	FBS(mg/ dl)	91.34	88.58	2.76	3.02	10.03	1.41	1.94	>.05
2	Lipid profile								
	CHO	188.22	166.5	21.72	11.53	27.40	3.87	5.58	<0.001
	TG	131.91	117.74	13.36	10.128	33.23	4.699	3.021	<0.05
	LDL	108.9	102.8	6.1	5.601	40.71	5.75	1.06	>0.05
	HDL	42.94	50.94	8	15.704	25.25	3.57	2.24	<0.05
	VLDL	29.84	31.34	1.5	5.02	14.15	2.001	0.750	>0.05
3.	Uric acid (mg/ dl)	6.274	6.16	0.114	1.81	8.86	1.254	0.091	>0.05
4.	B. urea (mg/ dl)	34.5	32.56	1.94	5.62	4.86	0.687	2.851	<0.05
5.	S. Creatinine (mg/ dl)	0.836	0.784	0.052	6.22	0.19	0.02	1.89	>0.05
6.	SGOT	33.68	30.64	3.04	9.026	10.39	1.47	2.06	<.05
7.	SGPT	38.28	34.24	4.04	10.55	11.40	1.61	2.50	<.05

Table 3: Effect on Subjective Symptomatology

Sr. No.	Symptoms	Mean grades					Difference	% relief
		B.T.	15th day	30th day	45th day	A.T.		
1.	Disturbed sleep pattern	1.33	1.33	1.01	0.98	0.33	1	75.187
2.	Abnormal temperament	1.16	1.14	1.02	0.50	0	1.16	100 %
3.	Abnormal mood	1.5	1.5	1	0.56	0.16	1.34	89.33 %
4.	Difficulty in daily routine as a result of memory related problems	1.5	1.5	0.9	0.8	0.5	1	66.66 %
5.	Lack of interest in activities other than necessary daily routine	1.5	1.3	1.1	1	0.5	1	66.66 %
6.	Headache	1.2	1	1.2	0.90	0.4	0.8	53.33%
7.	Easy irritability	1.16	1	0.19	1	0.16	1	86.20%

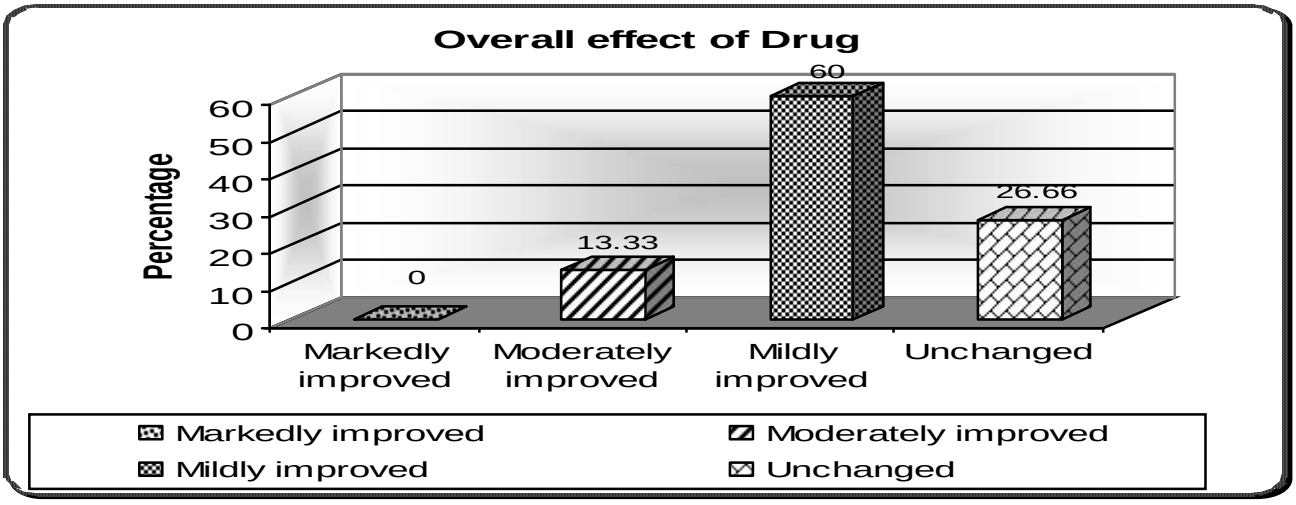
Table 4: Effect on Objective Symptomatology

Sr. No.	Variables	Mean					% relief		P
		BT	15th day	30th day	45th day	AT	Diff.	%age	
I	SUBTESTS FOR DHEE								
1.	Mental ability	6.60	6.66	7.01	7.85	8.500	1.900	28.78	<0.001
2.	Attention and concentration	6.97	7.06	8.98	10.00	11.13	4.16	59.80	<0.001
II	SUBTESTS FOR DHREETI								
3.	Delayed recall	7.07	7.50	7.78	8.15	9.17	2.10	29.719	<0.001
4	Verbal retention of similar pairs	4.53	4.69	4.87	4.87	5.00	0.47	10.280	<0.001
5.	Verbal retention of dissimilar pair	9.27	9.38	11.87	12.64	13.03	3.76	40.643	<0.001
6.	Visual retention	8.60	8.94	9.50	11.59	11.53	2.93	34.104	<0.001
III	SUBTESTS FOR SMRITI								
7.	Remote memory	5.06	5.56	5.78	5.82	5.93	0.87	17.094	<0.001
8.	Recent memory	4.43	4.48	4.49	4.65	4.97	0.53	12.031	<0.001
9.	Immediate recall	8.63	9.11	10.01	11.00	11.30	2.67	30.881	<0.001
10.	Recognition	6.83	7.01	7.05	7.19	8.50	1.67	24.392	<0.001

Overall Effect of Drug

Table 5:

S.No.	Overall effect of drug	No. of Volunteers	Percentage
1.	Markedly improved	0	0
2	Moderately improved	4	13.33%
3.	Mildly improved	18	60%
4.	Unchanged	8	26.66%



DISCUSSION

The trial medicine did not show any noteworthy effect on the haematological status of the volunteers who participated in the trial. The Hb level, TLC, DLC and ESR remained almost unaffected.

The trial medicine did not show any significant effect on the biochemical status of the volunteers who participated in the trial except lipid profile.

The mean score of S. cholesterol before trial was 188.22 mg/dl and after trial it became 166.5 mg/dl. S.D±27.4, S.E± 3.87 and statistically highly significant‘t’ value of 5.58 (p<0.001). The mean score of S. triglycerides before trial was 131.91mg/dl it reduced to 117.74mg/dl at end of trial. SD±33.23, S.E±4.699 and statistically significant‘t’value i.e. 3.021 (P<0.05).

The mean score of LDL before trial was 108.9 mg/dl & after trial was 102.8 mg/dl. S.D± 40.71, S.E±5.75 and statistically significant‘t’ value of 1.06 (p>0.05).

The mean score HDL before trial was 50.94 mg/dl and after trial it became 42.94 mg/dl. S.D± 25.25, S.E± 3.57 and statistically significant‘t’ value of 2.24 (P< 0.05).

The mean score of VLDL before trial was 29.84 mg/dl which increased to 31.34 mg/dl after trial. SD± 14.15, S.E.± 2.001 and statistically insignificant ‘t’ value of 0.750(p>0.05).

It means trial drug has significant role in lowering cholesterol.

Improvement in subjective symptom

- Disturbed sleep was improved by 75.18%, abnormal temperament was improved 100%, abnormal mood was improved by 89.33%, difficulty in daily routine as a result of memory related problems and lack of interest in activities other

than daily necessary routine was improved by 66.66%, headache was improved by 53.33% and easy irritability was improved by 86.20% which on the basis of criteria showed that all subjective symptoms was highly improved.

Improvement in total score assessed by 'Memory Scale'

- Mental ability showed 28.78% relief at the end of trial which was highly significant statistically at the level of p ($p<0.001$).
- Attention and concentration showed 59.804% relief at the end of trial which was highly significant statistically at the level of p ($p<0.001$).
- Delayed recall showed 29.719% relief at the end of trial which was highly significant statistically at the level of p ($p<0.001$).
- Verbal retention for similar pairs showed 10.280% relief at the end of trial which was highly significant statistically at the level of p ($p<0.001$).
- Verbal retention for similar pairs showed 40.643% relief at the end of trial which was highly significant statistically at the level of p ($p<0.001$).
- Visual retention showed 34.104% relief at the end of trial which was highly significant statistically at the level of p ($p<0.001$).
- Remote memory showed 17.094% relief at the end of trial which was highly significant statistically at the level of p ($p<0.001$).
- Recent memory showed 12.031% relief at the end of trial which was highly significant statistically at the level of p ($p<0.001$).
- Immediate recall showed 30.881% relief at the end of trial which was highly significant statistically at the level of p ($p<0.001$).
- Recognition showed 24.392% relief at the end of trial which was highly significant statistically at the level of p ($p<0.001$).

Thus, during this clinical study the results obtained from the keen observation of therapy, provided us evidence that this therapy was effective as Medhya.

Discussion regarding overall effect of drug

Overall effect of therapy shows that no volunteer was found to be markedly improved, 4 volunteers (13.33%) were improved moderately, 18 volunteers (60%) showed mild improvement. 8(26.66) volunteers remained unchanged. No patient was found to have nil response during this study. It is clear from above fact that this therapy was effective as *Medhya*.

PROBABLE MODE OF ACTION OF DRUG

Pharmacological action of *MedhyaRasayana* can be explained by two modes; *Prabhava* & *Rasa, Guna, Veerya, Vipaka*. Drugs with predominantly *Tikta rasa*, *LaghuSnigdhaguna*, *Sheetaveerya* and *Madhuravipaka*[10,11] exert beneficial effect on *Medha.* Simultaneously *Rasadiguna* effect formation of *rasadidhatu*, cleansing of *srotasa* and provocation of *agni.*

Akshotaka possess *madhura rasa, guru, snigdhaguna, Ushnaveerya* and *madhuravipaka*. On the basis of this probable mode of action can be explained as follows-*Dosha* involve in maintainence of *Medha* are *Tridosh* specially *Prana Vayu, Alochaka Pitta* and *TarpakaKapha.*

As said by *Sharangdhar Pitta* is lame (incapable of independent movement), *Kapha* is lame, so also are the seven *dhatus*. All these are driven by *vayu* from place to place like the clouds in the sky by the wind [12]. *Akshotaka* by its *UshnaVeerya* helps to hold the *Vata* in normal position. So the *Pitta* and *Kapha* also remain in the normal position.

The normal *Karma* of *Pitta* is given as: Vision digestion, heat, hunger, thirst, softness in body, lusture and intellect. These are the normal function of pitta[13].

Also the *Sthana* of *Alochaka Pitta* is *Buddhi*[14]. *Akshotaka* due to its *UshnaVeerya* normalized this *Alochaka Pitta* and helps to maintain *Buddhi.*

In the same way *the Dhreeti* is the *Karma* of normal *Kapha*in the body [15,16].*Akshotaka* is having *Madhura Rasa* and *MadhuraVipaka, Snigdha, Guru Guna,* by which it normalizes the vitiated *Kapha,* which is responsible for maintenance of *Dhreeti* of an individual.

The *Kapha* involved for this *karma*is *TarpakaKapha* because the *Sthana*of*Mastishka* is *Shira* and *shirasthakapha* is *TarpakaKapha* and its *Karma* is to do *Santarpana of Indriya*.[17]

Also the *UshnaVeerya* is having *agnivardhak* property. The drug (medicine) which is instituted as treatment should not only reduce the vitiating power of the *doshas* but also increase the *dhatubala.*This so because *dhatus* have to perform the function of maintaining a balance between the *doshas*. If the *dhatus* are strong, the *doshas* would not be able to produce any deformity no matter what is the extent of the vitiation of *doshas.* Simultaneously *rasadiguna* effect formation of *rasadidhatu,* cleansing of *srotasa* and provocation of *agni*. The *RasadiSaptaDhatus* are the outcome of successive evolution, the previous *Dhatu* being transformed into latter .The *Ahara Rasa* forms the substrate for this progressive evolution. Thus the *Rasa Dhatu* is formed foremost, then *RaktaDhatu*, and so on, up to transformation of *Majja* into *ShukraDhatu* and ultimately *Oaja*[18] . Hence it is having antioxidant and anti-inflammatory properties.

- When we assess the **chemical compositions** the drug **Akshotaka** contains **Polyphenolic compounds** which is having anti-amyloidogenic activity **and gallic and ellagicacid** which inhibit enzyme acetylcholinesterase. These results suggest that walnuts may reduce the risk or delay the onset of Alzheimer's disease [19,20].
- Also the drug is having omega-3-fatty acid which is reported for diverse therapeutic actions like central nervous system depressant, analgesic, antioxidant, immunomodulatory[21]. Hence contribute to better health and improved psychology of the patients, allow them better pain tolerance and even healthier stress free life.

CONCLUSION

- *Medha* can be correlated with memory. *Pitta* along with *kapha* plays a key role in enhancement of *Medha*.
- Man was oriented to procure *Medha* since the birth of civilization till today. This reflects the importance of *medha* or memory.
- *Dhee, Dhriti* and *Smriti* are functional units of *Medha* which can be correlated with steps in the process of memory perception, retention and retrieval respectively in Modern Psychology
- The effect of therapy showed that no volunteer was markedly improved, 13.33% volunteers were moderately improved, 60% volunteers were mildly improved and 26.66% volunteers remained unimproved.
- The probable mode of action of *Akshotaka* as *Medhya* is due to its *UshnaVeerya, Madhurarasa, Madhuravipaka,* and *Rasayana properties.*
- The *Medhya* effect of *Akshotaka* is more significant on *Dhee* out of *Dhee, Dhriti* and *Smriti* as mentioned in previous section.

No adverse effects of the drug were observed during the study.

Scope for further study

- ✓ The clinical study should be conducted on a larger group with long duration to reach at the proper conclusion.
- ✓ Combined therapy is advocated for more effective and sustained improvement in memory in a shorter duration of time.
- ✓ Comparative study should be carried along with modern drug.

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